THE PLANT DISEASE BULLETIN

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THE PLANT DISEASE SURVEY

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Vol. IV. October 15, 1920 Number 7

Diseases of wheat, corn, rice, cotton, potato, sugar cane, peanut, apple, and peach reported in this number.

Ophiobolus, on wheat affected with a disease that has the symptoms of take-all, has been found by members of the Department of Plant Pathology at the New York Stage College of Agriculture. Professor Whetzel's detailed report will be found on page 103.

Reports of other root troubles of wheat also given in this issue.

Brief summary and map showing final results of 1920 potato wart given on pages 109-110.

The comparatively clear weather that has prevailed during the first half of October in the northeastern states where late blight and rot of potato is prevalent has tended to check the progress of the disease. The trouble is still causing serious damage, however.

CEREALS

WHEAT

Foot rots, root rots, and seedling blights.

Since the notice of the recurrence of the so-called take-all at Granite City, Ill., (Pl. Dis. Bul. 4 : 9, 1920) reports have been received of the presence of root troubles, seedling blights, etc. in a number of different states.

The first thing of the kind to come to our attention this year was a report and specimens from C. D. Learn in Oklahoma. Mr. Learn reported as follows about June 15:

"This disease has been reported from different localities and has caused some anxiety among the wheat growers in those particular sections. The worst field I saw about Enid was 25% white heads and from that down to a trace. The farmers call it white cap and have suspected the trouble due to insects, but Prof. C. E. Sanborn, Station Entomologist, visited one of the localities and reports the trouble not that of insects. Reports of damage from 3% to 50% have been received.

"At the lower node black pycnidia develop which contain hyaline oblong spores. The basal leaves are infected at the node and may break away at this point. Not all the plants have matured for upon examination of the material I found plants four to eight inches high, which were dead and invariably the same pycnidia and spore was obtained."

Specimens of this disease examined at Washington and Madison, Wis. showed the fungus to be a Phoma, but no proof of its pathogenicity was obtained. This Oklahoma trouble adds another puzzle to the root rot problem.

The next report of a take-all disease came from New York, where a disease having the symptoms of the take-all that is described from Europe, and having present in the lesions at the base of the culms an Ophiobolus, apparrently Ophiobolus graminis, was found. H. H. Whetzel has submitted a report on the disease as follows:

"On July 15 Dr. Barrus was visiting our field assistant, Mr. R. G. Palmer, at Rochester, in Monroe County. Mr. Palmer called Dr. Barrus' attention to a circular dead area along the road in the wheat field of Mr. Rambert. A careful examination showed that the plants had died shortly before ripening, but after they had headed out. Dr. Barrus brought specimens to the laboratory, which were carefully examined by Mr. R. S. Kirby and Dr. H. E. Thomas with the result that they found a fungus suspiciously similar to Ophiobolus graminis described by McAlpine as the cause of "take-all" in Australia.

"A few days later Mr. Kirby and Dr. Thomas went to Rochester and in company with Mr. Palmer made a very careful and exhaustive examination of the diseased area in the field in which the spot occurred and found the disease completely confined to this single spot, which was about eight feet in diameter. The wheat had in the meantime been cut and shocked. They persuaded the farmer to permit them to completely destroy all of the wheat shocks in this area and for a considerable distance about it in order to make sure that all of the diseased wheat was destroyed. This destruction was affected by spreading the loosened bundles over the area, soaking with kerosene, and burning. In addition to this Dr. Thomas, a few days later and before the wheat had been hauled, destroyed the straw from the shocks surrounding the area which had been burned. This was done by cutting off the heads which the farmer would not agree to have destroyed, but would agree to feed to his chickens in an orchard that would never be used for growing grain. A very careful examination of the stubble in the adjoining area showed no trace of the fungus, which, even in the diseased area, was confined to the lower two internodes.

"Abundant specimens have been preserved for further study and Mr. Kirby and Dr. Thomas are actively at work in an attempt to isolate the fungus and determine its pathogenicity. A careful study of the fungus shows that it corresponds most closely with McAlpine's description. The perfect stage is present in abundance."

During the latter part of August J. G. Dickson from Wisconsin inspected a large number of wheat fields in Wisconsin and Minnesota. He has presented the following summary of the occurrence of a seedling blight of wheat, probably due to Helminthosporium sp. in the northern part of the state.

"Fourteen fields of wheat showed a blight quite different from the so-called take-all, ranging from a trace in most cases to 17% in one field. This latter field showed considerable spotting, which could not be accredited to soil conditions. All isolations made from the field gave the typical Helminthosporium which seems to be causing the blight through these regions. Approximately two acres of the field were engaged for further wheat experiments under the direction of Mr. H. H. McKinney.

"The seedling blight was generally present on the peat soils in Minnesota north of Duluth, varying with different varieties and methods of tillage. Mr. Barker, of Minnesota, reported similar observations in connection with his survey work in that state.

"This seedling blight seems in general quite different from that caused by Gibberella and Fusarium species and can generally be distinguished by the difference in color and presence on the leaves of lesions of Helminthosporium blight.

"While the Helminthosporium seedling blight was found through the northern regions surveyed there are no indications that this is connected with the so-called take-all."

Miss Wanda Weniger of North Dakota also found a similar trouble to that described by Dickson and reported on it as follows, August 18:

"Helminthosporium on wheat was found on Durum varieties, especially D5, D1, and Kubanka, as a blade blight and also as lesions on the bases of the culms and on the glumes and grains. From one to five percent of the heads were attacked in fields examined. As a blade blight, infection was found to run as high as eighty percent."

In Kansas a suspicious case was reported on by L. E. Melchers, September 23, as follows:

"A trip was made to Abilene, Kansas, to look after reports that have come in from an apparent root rot. These fields were visited in the company of Mr. H. H. McKinney of the Office of Cereal Investigations and Mr. Oscar Steanson, High School Teacher in Agriculture.

"Arrangements were made by which some of the fields will be put back into wheat and close supervision made of their behavior next spring. Specimens of wheat stubble were collected for laboratory examination. Information was gathered from reliable sources as to the behavior of these plants last spring. The organism or organisms involved have caused the darkening of the lower portions of the culms and a distinct rotting of the roots, with poorly developed culms, frequently turned white.

"There has been a suspicion that the disease may be take-all. There are field symptoms of its being the disease, but no definite statement can be made until further work has been done on the problem. For the most part, it seems to be occurring in soft wheat."

CORN

Smut caused by Ustillago zeae.

Smut is apparently causing somewhat less damage than usual.

Vermont: Seems to be unusually abundant this year all over the stage according to reports, We have had more locally than I have ever seen before. (Lutman, Oct. 1)
Massachusetts: About the usual amount - not over .5%. (Osmun, Oct. 1)
New Jersey: Common, in some cases abundant. (Cook, Oct. 1)
Virginia: Common, but no severe cases seen - about 1% ear infection on the average. (Fromme, Oct. 1)
Tennessee: Very general over the state, but less than in previous years. Most of the corn was late this year and generally smut is less damaging on late corn. (Essary, Oct. 1)
Georgia: Observed on various parts of the plant in the case of several varieties of field corn, 1% or possibly less in some cases. In sweet and pop corn smut of ears is most important, showing as high as 2%. (McClintock, Oct.1)
Alabama: Light infection in vicinity of Auburn. No further data. (Thiel,Oct.1)
Mississippi: Have not observed smut to any degree this season. Specimens have been received from only one county. (Neal, Oct. 1)
Arkansas: Two per cent loss. (Elliott, Oct. 1)
Ohio: Tassel infection is more generally observed this season than usual. Although corn smut may very readily be found in all fields, losses cannot be reckoned greater than during normal seasons. Certain fields of sweet corn have been observed in central Ohio where the corn smut infection is very slight, much below normal. (Thomas, Oct. 1)
Michigan: Not so serious as last year. (Coons, Oct. 1)
Wisconsin: Less than in 1919. Late planted fields show more than early planted. Heavy growing varieties like Evergreen show more than the smaller early varieties. (Vaughan, Sept. 1)
Less than usual. Not considered serious except in sweet corn planted without attention to rotation. (Vaughan, Oct. 1)
South Dakota: Present in every field in small amounts. (Evans, Oct. 1)
Nebraska: Corn smut prevalent throughout the state. (Goss, Oct. 1)

Root, stalk, and ear rots caused by Gibberella spp. and Fusarium spp.

Corn root rot seems to be less important than usual in most of the states reporting its presence. Mississippi, Arkansas, and Ohio, however, report considerable damage from this disease.

G. N. Hoffer of the Office of Cereal Investigations reported the results of a field trip through Indiana, Ohio, Pennsylvania, and New York as follows (Cereal Courier 12: 272, August 20):

"The entire survey showed conclusively that, along with troubles arising from the late planting of corn, due to the unfavorable seasonal conditions, much of the corn is infected. This fact was especially noted when plants in adjacent fields of the same apparent

age would be non-uniform in size and much more so than could be accounted for by differences in rotational practices. Proper care in the selection of seed stocks is imperative. The best soils in all of the localities studied had fields of corn showing many irregularities in growth due to the use of poor, infected seed."

Massachusetts: Not important. (Osmun, Oct. 1)
New Jersey: Not so severe as usual. (Cook, Oct. 1)
Virginia: General but apparently not so severe as last year. (Fromme, Oct. 1)
Tennessee: Occurs in every field thus far observed; causing considerable loss in broken stalks; a good percentage fallen stalks (down corn). Loss due to sterile stalks high. (Dept. of Botany, Oct. 1)
Georgia: Present throughout the state, but most serious in south Georgia on the lighter soils. (McClintock, Oct. 1)
Alabama: Present in small quantities. (Thiel, Oct. 1)
Mississippi: These troubles have been encountered in several localities in the state. Stunted plants and root rots are common, as well as ear rot. These diseases are no doubt responsible for at least 5% reduction in yield for the state, and I believe are gaining headway. (Neal, Oct. 1)
Arkansas: Five per cent loss. (Elliott, Oct. 1)
Ohio: Corn root rot situation is especially alarming in southwestern Ohio, although there is no difficulty in finding evidence of infection in all sections of the state where corn is grown. Fields very badly infected show a loss varying from 25-90%. Where particular attention has been given to the selection of seed corn last fall and also germination tests previous to planting in the spring, very excellent control has been accomplished, although the season has been very favorable for the development of the disease. In many such fields the number of infected stalks is estimated to be less than 1% in sections where the disease has been destructive in previous years. (Thomas, Oct. 1)
Michigan: Uncommon. (Coons, Oct. 1)
Wisconsin: Less than in 1919. Some fields on old ground badly diseased. (Vaughan, Oct. 1)
South Dakota: Present in every field, but not doing extensive damage. (Evans, Oct. 1)
Nebraska: Corn root rot reported to be present in several counties of eastern Nebraska. General infection with moderate damage in Richardson and Douglass Counties. (Goss, Oct. 1)
Washington: One report from western Washington. (Heald & Dana, Oct. 1)
Oregon: Perhaps present as root rot. A few suspicious specimens received. No survey work done to determine extent or damage. (Barss, Oct. 1)

Brown spot caused by Physoderma zeae-maydis.

Tennessee: Heavy infections in local areas only; not generally severe over the state. (Dept. of Botany, Oct. 1)
Georgia: Observed on field corn throughout the central and southern parts of the state. (McClintock, Oct. 1)
Alabama: Early varieties of corn more heavily infected than others. (Thiel, Oct. 1)
Mississippi: Prevalent in almost every part of the state, but very little damage results. (Neal, Oct. 1)
Arkansas: Common - not serious. (Elliott, Oct. 1)

Nebraska: Physoderma especially bad in eastern Nebraska this year. See report of September 15. (Goss, Oct. 1)

Bacterial wilt caused by Aplanobacter stewartii

Collaborators in the following states report that this disease has not been brought to their attention this year: Vermont, Massachusetts, New Jersey, Georgia, Alabama, Mississippi, Michigan, Wisconsin, South Dakota, Washington, and Oregon. One report was received in Arkansas and the disease has been observed in Ohio and Virginia this year.

Correction: The statement that bacterial wilt is occurring on field corn in Tennessee (Pl. Dis. Bul. 4 : 70. 1920) is erroneous. Mr. Kurtzweil reported this as a bacterial root rot and not as Aplanobacter stewartii, as implied in the Bulletin. The name of the causal bacterium in this case is not known, but the symptoms resemble those of the bacterial root rot described from Arkansas (Ark. Agr. Expt. Sta. Bul. 162: 1919).

Bacterial root rot, undetermined.

This disease (See Ark. Agr. Exp. Sta. Bul. 162 : 1-7. 1919) has been reported this year from one locality in Arkansas, according to a report from the Department of Plant Pathology at Fayetteville. A somewhat similar disease has also been observed causing damage to field corn in Tennessee according to Carl Kurtzweil.

Leaf blight caused by Helminthosporium sp.

Tennessee: Every field visited this season has shown this disease. Estimated that 30% of the leaf surface is affected. (Dept. of Botany, Oct. 1)

Rust caused by Puccinia sorghi

Rust has been reported as of little importance in Massachusetts, Alabama, and Wisconsin.

Head smut caused by Sphacelotheca reiliana

Washington: Seems to be less prevalent than in previous season. Not known to occur except in the vicinity of Pullman. (Heald & Dana, Oct. 1)

RICE

Blast caused by Piricularia oryzae

Mississippi: A number of fields have been found to be infected in Pearl River County. In one instance, in a field of thirty acres, the

infection is fully 40%. The disease has also been reported from Lauderdale County. It looks as though this disease is destined to become serious in this state. (Neal, Oct. 1)

VEGETABLES AND FIELD CROPS

COTTON

According to the Bureau of Crop Estimates the condition of cotton was 59.1% of normal on September 25, as compared with 67.5% on August 25, 1920, a reduction of 8.4% during the latter part of August and September. This is a somewhat greater reduction than usual, being 3.2% greater than the ten year average. Rotting of the bolls seems to play a considerable part in bringing about this reduction. Many complaints of damage from boll rots have been received from the majority of the cotton states by field men of the Weather and Crop Estimate Bureaus. In some states also "rust" (malnutrition) is causing heavy loss. It is expected, however, that the total crop this year will exceed that of last year by about 800,000 bales.

Fusarium wilt caused by Fusarium vasinfectum

Tennessee: Not generally reported, but has been observed in experimental plots at Jackson, western part of state. No varietal differences noted. (Essary, Sept. 1)

South Carolina: In the wilt infested section of lower South Carolina on the S. A. L. Railway from Fairfax to the Georgia line, I saw several hundreds of acres where the dead and dying plants constituted from 5-10% of the total plants. (Armstrong, Sept. 1)

Texas: Prevalent in light soils - 1½% loss. (Taubenhaus, Sept. 1)

Root knot caused by Heterodera radicicola

South Carolina: Injury slight on a few farms in Saluda County near Monetta. Injury about 2% in a 40-acre field in Allendale County. Another field of 75 acres showed about 4% injury. Injury slight to none in several fields aggregating 200 acres near Barnwell, in Barnwell County. (Armstrong, Sept. 15)

Texas: Traces - unimportant. (Taubenhaus, Sept. 1)

Anthracnose caused by Colletotrichum gossypii

Tennessee: Very abundant. Damage serious. Heavy shedding is reported, but whether this is due to attacks of the anthracnose-fungus has not yet been determined for this season. (Essary, Sept. 1)

South Carolina: Anthracnose injury was slight in all fields visited - less than 1%. These reports cover conditions as I have observed them in sections of three counties in South Carolina,- namely, Allendale, Barnwell, and Saluda. (Armstrong, Sept. 15)
Texas: Prevalent - 2% loss. (Taubenhaus, Sept. 1)

Angular leaf spot caused by Bacterium malvacearum

Tennessee: Very common wherever cotton is grown. Exceptional rains in August. (Essary, Sept. 1)
Texas: Prevalent in poorly drained land - 2% loss. (Taubenhaus, Sept. 1)

Root rot, caused by Ozonium omnivorum, is epiphytotic this year in Texas according to J. J. Taubenhaus.

POTATO

Potato wart caused by Chrysophlyctis endobiotica

As a result of the 1920 survey for potato wart the disease has been found in five new localities in western Pennsylvania and three villages in Maryland. The discoveries in Maryland add a third state to the list of those where the disease occurs.

The present known range of potato wart in the United States, then, based on surveys in 1919 and 1920, includes the original district in the eastern Pennsylvania anthracite coal fields and the area in western Pennsylvania, western Maryland, and northern West Virginia. The limits of the western area as we now know them are Clarence in Center County, Pennsylvania, on the northeast and Whitmer in Randolph County, West Virginia, on the southwest, a distance of about 175 miles.

The greatest width is in Pennsylvania from Robertsdale in Huntingdon County to Yatesboro in Armstrong County, which is approximately 80 miles. Undoubtedly other infested localities as yet undiscovered exist in the bituminous coal mining section. Unlike the infestation in eastern Pennsylvania, the infested localities in the soft coal regions apparently are scattered and the disease occurs in a single garden or in a small number of gardens in each village.

The accompanying map shows the location of the places in the western area where the disease has been found to date.

SUGAR CANE

Mosaic (cause undetermined)

Mosaic is causing serious damage in some sections of Mississippi, according to the reports received. It is said to be of considerable importance in the Hawaiian Islands.

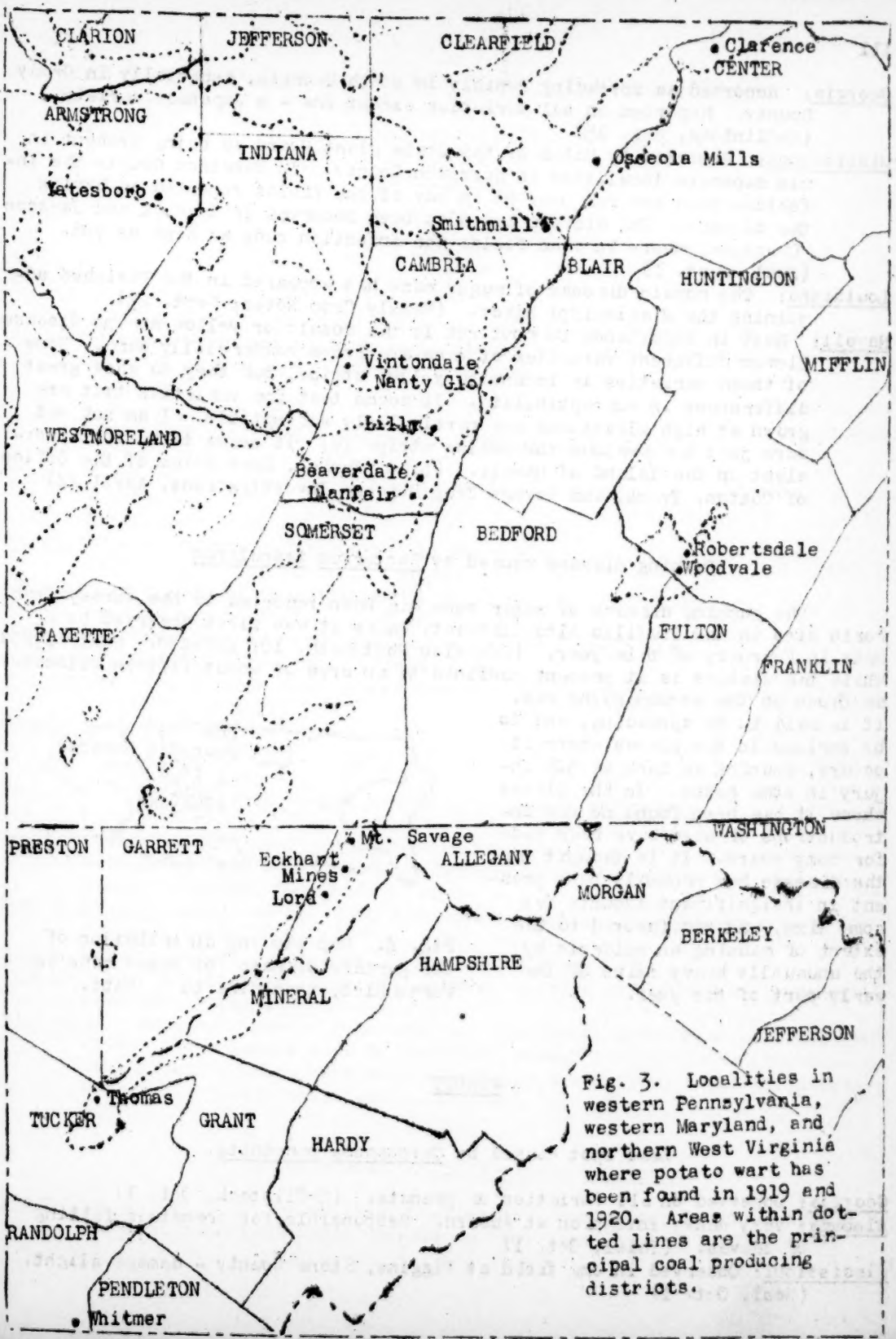

Fig. 3. Localities in western Pennsylvania, western Maryland, and northern West Virginia where potato wart has been found in 1919 and 1920. Areas within dotted lines are the principal coal producing districts.

Georgia: Reported as spreading rapidly in south Georgia, especially in Grady County. Reported on all varieties except one - a Japanese variety. (McClintock, Aug. 15)

Mississippi: Reported by Miles of the State Plant Board as being present in six separate localities in Harrison County. In Harrison County the infection does not run over 5% in any of the fields reported as having the disease. The disease has also been observed in Hancock and Jackson Counties, where in some fields the infection runs as high as 90%. (Neal, Sept. 1)

Louisiana: The mosaic disease of sugar cane has appeared in the Parishes adjoining the Mississippi River. (Weekly Crop Notes, Sept. 23)

Hawaii: Next in importance to root rot is the mosaic or yellow stripe disease. Eleven different varieties of cane are grown commercially here. None of these varieties is immune to yellow stripe, but they do show great differences in susceptibility. It seems that the varieties that are grown at high elevations are particularly susceptible. I am not yet sure just how serious the yellow stripe is. It seems to be most prevalent on the Island of Hawaii. (L. O. Kunkel, News Notes of the Office of Cotton, Truck, and Forage Crop Disease Investigations, April 24)

Gumming disease caused by Bacterium vasculorum

The gumming disease of sugar cane has been reported to the Survey from Porto Rico in the Trujillo Alto district, where it was first observed by J. Matz in February of this year. (See also Phytopath. 10: 429-430. Sept. 1920) While the disease is at present confined to an area of about fifteen kilometers, as shown on the accompanying map, it is said to be spreading, and to be serious in the places where it occurs, causing as much as 50% injury in some cases. In the places where it has been found no new introductions of seed have been made for many years. It is thought that the disease has probably been present in insignificant amounts for some time, and was favored to the extent of causing an epidemic by the unusually heavy rains of the early part of the year.

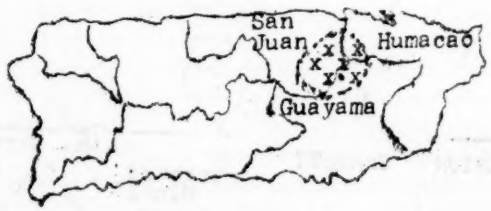

Fig. 4. Map showing distribution of the gumming disease of sugar cane in Porto Rico, according to J. Matz.

PEANUT

Leaf spot caused by Cercospora personata.

Georgia: Observed on all varieties of peanuts. (McClintock, Oct. 1)

Alabama: Very heavy infection at Auburn. Responsible for premature falling of leaves. (Thiel, Oct. 1)

Mississippi: Observed in one field at Wiggins, Stone County - damage slight. (Neal, Oct. 1)

Arkansas: More severe than usual. Some injury. (Elliott, Oct. 1)

FRUITS

APPLE

Further reports on apple diseases indicate the general prevalence of scab in the northern and eastern apple states and the rather unusual severity of fire blight on the apple over the same area.

Scab caused by Venturia inaequalis

Maine: First noticed June 11 in the vicinity of Corinna. But few cases of infection and little damage noted up to and including Sept. 11. (C. R. Stevenson, Sept. 11)
Vermont: Some infection locally on all the susceptible varieties. Probably a little more than normal. (Lutman, Sept. 1)
New Hampshire: General throughout the state and considerable damage done to fruit of susceptible varieties. (Butler, Sept. 1)
Tennessee: Unusually abundant this year. (Essary, Sept. 1)
Indiana: Extremely prevalent. (Gardner, Sept. 1)
Wisconsin: Scab is more destructive than usual except in well sprayed orchards. (Vaughan, Sept. 1)
Texas: None found. (Taubenhaus, Sept. 1)

Fire blight caused by Bacillus amylovorus

Vermont: Very common locally in large orchards. Almost all trees that have much fruit have a considerable percentage of fire-blight of the flower twigs. (Lutman, Sept. 1)
New Hampshire: Mainly in the form of blossom blight. Injury unimportant. (Butler, Sept. 1)
Texas: Very prevalent. 10% loss. (Taubenhaus, Sept. 1)
Indiana: Very destructive, especially where blighted pear trees are nearby. (Gardner, Sept. 1)
Wisconsin: Unusually severe this season. Many young trees have been nearly killed. The losses will be heavy but almost impossible to estimate. Wealthy and McMahon have been especially susceptible. The northwestern Greening is quite resistant. (Vaughan, Sept. 1)

Blotch caused by Phyllosticta solitaria

Pennsylvania: Dr. W. S. Beach, Field Laboratory, Bustleton, Pa. says blotch is the most important apple disease in that locality.

Occurs generally throughout the state, damage slight except on unsprayed trees. Worst on Smith Cider, Maiden Blush, Ben Davis, and all sweet apples. (Department of Botany, Sept. 1)

Texas: Prevalent. 5% loss. (Taubenhaus, Sept. 1)

Indiana: Very abundant on susceptible varieties in southern half of state. (Gardner, Sept. 1)

PEACH

Brown rot caused by Sclerotinia cinerea

There was less brown rot in New York peaches than usual this year due apparently to dry weather at and prior to picking time. In Pennsylvania and New Jersey and states farther south it caused considerable damage. (See also Pl. Dis. Bul. 4 : 19-20; 64-66. July 15 and Sept. 1)

New York: Very little of this disease was seen on fruit in the packing houses, but a small amount of rotten fruit, mummies and killed twigs was found in every orchard visited. In a 200-acre orchard near Webster in Monroe County, it seemed to be worse on trees growing on low ground. The whole district this year had dry weather at picking time, and for two or three weeks previously, a fact which probably accounts for the small amount of Rot this year as compared with last, when there was more rain. (D. H. Rose, Bu. of Markets Div. Letter 127: 9. Sept. 30)

New Jersey: Wet, muggy weather has caused considerable rot. (Weekly Crop Notes, Sept. 2)

Pennsylvania: Damage very considerable. Confirming earlier report (see Pl. Dis Bul. 4 ; 66, Sept.1, Thurston, Aug. 15)

Delaware: Peaches have had too much rain and there is some complaint of rot. (Weekly Crop Notes, Sept. 2)

Maryland: Some complaint of peaches showing rot. (Weekly Crop Notes, Sept. 2) Peaches reported to be rotting in some sections. (Weekly Crop Notes, Aug. 26)

Virginia: Peaches rotting badly in farm orchards. (Weekly Crop Notes, Sept. 2)

North Carolina: Suffering from considerable rot. (Weekly Crop Notes, Aug. 26)

Scab caused by Cladosporium carpophilum

Pennsylvania: Prevalent on all unsprayed peaches. No estimate as to damage. (Thurston, Aug. 15)

Indiana: Very severe attack on the fruit in the Vincennes region. Much worse than last year. (Gardner, Aug. 15)

Black spot caused by Bacterium pruni

Indiana: Extremely severe this year in the Vincennes region. Caused defoliation by its leaf attack, death of small branches by girdling cankers, and severe blemishing of fruit. There was severe hail injury and practically every hail wound was infected with Bacterium pruni.

Illinois: Bacterial shot hole of peach is quite serious on the fruit in this state, especially the southern half. (Anderson, Aug. 24)

Crown gall caused by Pseudomonas tumefaciens

Ohio: In one orchard investigated, nearly all trees of the early Crawford and Trumbull varieties were infected. In no instance was the Elberta found to be infected. In some orchards the spread of infection has been quite evidently accomplished through drainage water. In such cases the losses have been very severe. (Thomas, Aug. 15)

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